

Cost Management and Performance Measurements for Petroleum Upstream Industry – Part B

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Abstract

Cost control and management is not appropriate only for manufacturing and commercial industry; cost management is applied in upstream industry such as Petroleum exploration, development and production cost. Many Petroleum Companies don't pay more attention to cost control and especially during exploration phase except if Companies face financial dilemma, declining production or if they see they cannot meet their planned schedule of Capital program that lead them to not meet their obligation, commitments and required return, therefore, they start considering cost reduction or control. This paper provide management accountant, cost controller, financial controller, financial manager, internal auditor and cost recovery auditor with brief of cost control, how cost is analyzed and managed and performance is measured in Petroleum upstream industry.

Keywords: Cost Management and analysis for petroleum exploration, Optimizing production, exploration and development programs, Project Cost Management and Analysis for Petroleum Upstream Industry, Procurement Cost Management, Drilling Cost Management, Production Cost Management, G&A Cost reduction.

In the previous paper “Fundamental Cost Analysis In Petroleum Upstream Industry – Part A”, we discussed the fundamental cost analysis that help non-financial or nonaccountant to understand the basic cost management.

In this paper we will discuss about the cost management and analysis for measuring the performance of oil and gas companies. And how Oil and gas companies can manage the costs and align its frequently activities to the strategies to achieve their strategic objectives by controlling and managing the costs through several control techniques and balance scorecard. This paper screening the concepts of balance scorecard and control techniques.

We will explain how each department in the company can contribute in and measure its performance for achieving the strategies of the

company in the Part D. Part C will cover the cost management and analysis for performance evaluation in more technical and management accounting view.

In this paper we start our section number with 5 to be in consequent with the previous paper of “Fundamental Cost Analysis In Petroleum Upstream Industry – Part A”

5) Cost Control Techniques

Cost control techniques can help Petroleum Companies achieve good financial results and overcome difficulties they face. Cost control can allow Company to know if they are really spend more than it should be for petroleum exploration, development and production. The

below techniques will give our accountant more information about how to manage such costs.

5.1) Cost and Contract Analysis

Petroleum Company shall breaking down the cost and classifies them by management function and nature to enable to assign responsibility of cost to appropriate management or department and should track them and record them in proper cost accounts.

Management accountant, cost analyst or cost controller should develop Worksheet of actual costs and applying statistical analysis to determine the correlation between cost and variable factors.

Management accountant, cost analyst or cost controller should conduct with technical staff to know the appropriate relationship between variables and costs formulas.

Petroleum Company should authorize management accountant, cost analyst or cost controller to analyze service contracts and measure the hidden (implicit) costs of Contractors due to inefficiency, missed details of Statement of Work (SOW), inappropriate evaluation criteria, inappropriate applying tender and procurement process.

For example, Petroleum Company can calculate the total costs incurred by its drilling service contractor. Contract Analyst should consider the efficiency of drilling wells and experience of driller by computing the hours that it is taken for trip time for changing bits. The lower hours the higher efficiency of contractor is and lower costs can incurred. Also, the higher experience drilling engineer, the lower probability of lost circulation and stuck pipe that are due to lack of knowledge and experience of personnel or drillers then the lower costs can be achieved. The higher technological which driller use, the lower costs can be achieved by avoiding lost circulation and stuck pipe. Also, the experience

of drillers or drilling personnel or management to drill in different type of drilling such as horizontal drilling or deviated drilling that can reduce the total costs by saving the cost of site construction.

Missed Contract details that describe the SOW, open contract, providing information unequally to suppliers with knowing that changes will be incurred after winning the business can cause higher services costs.

5.2) Reporting and Accounting System.

Management accountant or cost controller shall realize that different companies use different financial and cost accounting system.

Petroleum Company shall combine between financial and cost accounting and determine which cost accounting system is the best to help several level of decision makers. Also, cost and financial reporting is important to know the profitability and measure the performance of Petroleum business segments.

Financial accounting is different from cost or project accounting, Company's system should be designed in manner that can provide relevant, reliable, consistent and comparable information to several stakeholders. The financial information is most likely used by investors, creditors, analysts, stock brokers, government, management and employees but the cost or project accounting information is most likely used internally by different level of management and employees.

Financial and cost accounting system should categorize, group and consolidate transactions or events by designing accounts codes that determine the transactions that can be categorized, grouped and consolidated and reported in specific manner to meet the financial requirements which is ruled by GAAP or IFRS, and that could be categorized, grouped and reported in specific manner to meet the cost or

project requirements which is ruled by prevailing industry's practices, stakeholders' needs and company policy.

We will assumed that how the costs of two vehicles hire, one is leased for supporting seismic acquisition activities and it is non-recoverable and another is leased for supporting development activities for drilling Well A, how these costs should be recorded in the financial and cost accounting system. Company's system include chart of accounts that contains the financial accounts, project and cost accounts, cost recovery accounts. Let's assume that seismic acquisition campagne was approved by AFE300 and it is categorized under sub-account No. 10 that is assigned for G&G expenses and G&G is expensed but intermediated by second head account no. 70 and first head account No. 02 which is assigned for exploration and evaluation and element cost no. 6000 is assigned for vehicle hire. Also, the AFE200 for well A campaign was approved by partners, which is categorized under sub-account no. 25 that is assigned for drilling cost which is under second head account no. 20 that is assigned under development costs and first head account no. 02. And R is assigned for the recoverable costs code and N is assigned for the non-recoverable costs code. The coding will be lined as follow:

02.70.10.AFE300.6000.N
02.20.25.AFE200.6000.R

Based on the above coding line. The coding contains Financial accounting codes that represents exploration and evaluation code (02), exploration (70) or development (20) codes and financial activities coding that determine if it is seismic or drilling the seismic acquisition code is (10) and drilling code is (25) + Projects accounting codes which is flexible codes that is established based on AFE for example (seismic acquisition AFE300 and AFE200 for drilling Well A) + cost accounting code that represents

the detailed type of costs and assigning code 6000 for vehicle hire+ Recovery accounting codes.

Based on appropriate accounts coding, the Company will be able to generate the appropriate reporting for several purposes. And based on the above example, the company can generate financial statements by grouping all the amounts of transactions that contains exploration code (70) in the income statements under exploration expenses and development cost that contains code 20 under capital expenditures of exploration and evaluation balance. Also, can generate cost reports that grouped the costs by function (exploration, development), activity (G&G, seismic acquisition or drilling) and by detailed type of costs elements, and can generate a cost recovery report to the government by grouping the transactions that contains recovery code.

Also, the financial, project and cost accounting systems must be integrated, the system should be designed smartly to enable to enter non-financial input data in the project systems and cost accounting system such as volume of reserves, volume of production, depth of well, area that run seismic based on service requisition or technical reports on frequently basis to enable the cost accounting system to calculate the cost of production, and cost at completion for projects and completion percentage for managerial purposes and determine the DD&A and accrued expenses for financial purpose.

5.3) Budgeting

Budget is tool for planning at the beginning of the period and can be used as tool of control at the end of the period to help management to measure the performance against plan of sales, capital expenditures, production cost. Therefore, Petroleum Company prepares comprehensive Master budget by using computer software to

enable Company to compare the actual figures to estimated figures easily.

Petroleum Company may use one or all of the below type of budget processing.

5.3.a) Traditional Budget

Traditional budget is adding and subtracting a percentages in comparison to last period to find new budget for the coming year. This is more appropriate to be used for utilities expenses, sales budgets and specific production costs items.

5.3.b) Zero-Based Budget (ZBB) and Activity-Based Budget (ABB)

ZBB and ABB examine costs and benefit for all activities, ZBB start from scratch but ABB not. These techniques help Company to measure the performance of management's effectiveness but preparation of ZBB consume lot of time to be prepared. Many Oil and gas companies use project budget which is more similar to ABB.

Theoretically budget can be used for identifying standard costs for all cost elements, but practically standard costs cannot be used in petroleum upstream industry for all cost elements, it might be used to time writing costs to monitor and plan for the cost of expatriates but it is difficult and impractical to apply standard costing system for all costs elements.

6) Breakeven and Cost-Volume-Profit (CVP) Analysis

CVP and breakeven analysis help management accountant to perform useful analysis. breakeven is branch of CVP analysis that determine the sales which matches the costs and generate zero profit.

Petroleum Company can use CVP and breakeven analysis to know the following

- Daily production and sales volume that is required to breakeven
- Daily production and sales required to earn a desired profit.
- How the changes in oil/gas price, variable operating costs and fixed Finding & Development costs.

However, the oil/gas price is less to be controlled, but Major oil producers and consumers in the world participate in determine the oil/gas price in world market. Therefore, rise of breakeven price is mainly caused by increasing in operating costs and increasing in F&D costs. The below formulas compute the breakeven point (BEP) and CVP in units.

$$BEP = \frac{Fixed\ Cost}{Oil\ or\ gas\ price - Variable\ Cost\ per\ unit}$$

Where: Variable Cost per unit = Direct Production cost ÷ Volume of production in barrels

$$CVP = \frac{Fixed\ Cost + Operating\ Profit\ before\ Tax}{Oil\ or\ gas\ price - Variable\ cost\ per\ unit}$$

Where: Operating Profit before tax = Net profit ÷ (1-Tax rate)

7) Leverage

Leverage is common techniques is used in Petroleum upstream industry, it calculates the operating leverage and financial leverage which shows how much an sales increase/decrease by 1% can expect Company's Earning Per Share (EPS) to increase or decrease by percentage. The high degree of leverage is, the high risk the Company would face if the production or commodity price is declined.

The high oil/gas price enable inefficient producers to continue exist and enables to produce from inefficient wells which it was infeasible before increase of oil/gas price and become feasible after rising price of oil.

8) Performance Measurement and Scorecards

Performance is measured through Key Performance Indicators (KPIs) which are essential tools used by management to understand how far their business is successful.

The KPIs are grouped together and presented in dashboard which is called scorecard to enable the management to take a glance over the view of how the Company is performing its business. Most of Scorecards grouped such KPIs into four prospectives or more as follow:

Financial prospective measures the performance of for-profit organizations whichever they are public or private. Financial prospective includes the following KPIs

- Operating Profit Margin

Operating Profit Margin can provide an indication of the operating efficiency of a company. Operating profit is calculated by deducting the operating costs from revenue generated from normal course of business, the revenue generated from extraordinary items or discontinued operations is not considered, and divided by the operating revenue to get operating profit margin:

Operating Profit Margin = $(\text{Revenue} - \text{Operating Cost}) \div \text{Revenue}$

The information of the above formula is obtained from the financial statements and periodical financial or accounting reports of a system. Company can monitor this indicator on monthly, quarterly and annual basis.

If a company faces difficulty to generate revenue from normal course of business activity and operating profit margin is reasonably high, it can give an indication to cost leadership strategy that company may follow and the ability of managing operating cost well, otherwise, the company may seek to sell part of its working interests to generate revenue and recover part of its costs.

- Net Profit Margin

Net Profit Margin can provide an indication of the overall business efficiency of a company. Net profit is calculated by deducting the operating costs, financing cost, general and administrative cost, cost of extraordinary or discontinued operations from all revenues that are generated from normal course of business, or extraordinary and discontinued operations, and divided by the operating revenue to get operating profit margin:

Net Profit Margin = $(\text{Revenue} - \text{Operating Cost} + \text{Other Income} - \text{Finance, G\&A \& Other expense}) \div \text{Revenue of normal course of business}$

The information of the above formula is obtained from the financial statements and periodical financial or accounting reports of a system. too Company can oversea this indicator periodically.

If Company faces low operating profit margin and high net profit margin, it gives strong indication that Company generate revenue from not main business activity e.g. sell part of its working interests in some licenses

- Total Shareholder Return/ Return On Equity

Return on ordinary Shareholder's Equity (ROE) measures the profitability exclusively the return on the real owners' funds. Stockholders

are primarily interested in the relationship between net income and their investment in the company. This is probably the single most important ratio to judge whether the firm has earned a satisfactory return for its equity-holders or not. Its adequacy can be judged by comparing it with the past record of the same firm, inter-firm comparison and comparisons with the overall industry average. The higher rate is, the more efficiency in utilizing the owners' funds.

$$\text{ROE} = (\text{Net income} - \text{Preference dividend}) / \text{Average Ordinary Shareholder's Equity}$$

The information of the above formula is obtained from the financial statements and periodical financial or accounting reports of a system. Company can measure its profitability frequently.

The more costs are decreased, the higher ROE ratio will be. The high ROE gives an indication that company does not need to depend on loan to finance its projects.

- Capital Expenditures to Revenue Ratio

Oil and Gas Companies intend to acquire new property, develop current proved property, or even explore unproved property to generate future benefits. This ratio is comparing the capital expenditures to sales or revenue (Capex for specific period ÷ Revenue for the same specific period) which gives us impression of how much Company is investing for future benefit. Lower ratio is not always good indication and vice versa for higher ratio. To know how better the Company invest for future, the ration should be compared with the average industry or other peers'. Also, Company should consider that much investing in petroleum acquisition, exploration, development without producing enough oil or gas can give bad indicator about the technical management performance of Company.

Information for calculating the above ratio is obtained from accounting or financial systems. But different accounting method can lead us to different results and misstate this ratio, but many companies prefer to charge all the exploration cost to Capex then to take it off to expenses to give total capital expenditures for the current period.

- Price/Earning Ratios

Many companies use price/earnings ratio to know how their stocks (shares) are attractive in stock market for potential investors. This ratio searches for the relationship between the stock price and company's profit.

$$\text{P/E Ratio} = \text{Current stock price} \div (\text{Net profits per share})$$

Also, this ratio can express the time for recovering back the initial investment in buying Company's stock. In cost management, P/E ratio can be increased if the cost managed to be reasonably decreased. Therefore, the higher P/E ratio is, the more stock is attractive for potential investors who pay more for each dollar (unit of currency) of net income, and the more expensive the stock is.

- Finding & Development Cost Ratio

It can be used for evaluating the efficiency of a company in adding new reserves. If we want to measure the performance of technical performance of companies or managements the finding cost ratio which include only exploration costs the reserves extensions and discoveries can reflect how efficient they are, the high ratio, the more efficient they are. To know how the overall efficiency or experience of company's management, we can consider all the costs and all reserves additions into your considerations. [Charlotte J. Wright and Rebecaa A. Gallun, 5th Edition, 2008, *Fundamentals of OIL & GAS*

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- Success Rate

This rate is calculated by dividing the cost of drilling successful well to total cost of investment in drilling wells, that shows the performance of exploration and drilling departments. The higher rate is, the higher technical performance Company has and good indication that Company is managing its Capital expenditures well.

- Present Value of expected cash flow for proved and probable reserves per share

McDep LLC is independent researchers focused on stocks of oil and gas Companies, which originate McDep ratio that measures Company's ability to generate discounted cash flow in future from oil/gas or other business for covering its market capitalization at current stock price and debt. The Company that is low Market Capitalization and debt to present value of oil/gas reserves and other business is performed better and more profitable than Company's stock is high capitalization and debt to present value ratio.

Internal process prospective include the following KPIs

- Capacity Utilization Rate

Capacity utilization is good measure that provides management with oversight how the production facility units are utilized and are their appropriateness to the production when they are purchased.

Capacity Utilization Rate = Actual production per day ÷ maximum quantities is produced per day for the facility equipments.

The lower rate is, the more slacks are, and higher inefficiency is in the process. And can

give strong indication that Cost of facility equipments is high too because Company purchased assets has much higher capacity than the wells can produce. Which can increase the finding cost, DD&A, decrease the operating profit and net profit that may lead Company to face difficulty in profitability in future.

Information for calculating the above rate is obtained from technical internal process system and capacity of facility equipments can be estimated and obtained from equipment data that is provided by manufacturer.

- Earned Value or Budget Cost of Work Performed (EV or BCWP)

Earned Value is one of operational processes that used as a tool for combining costs, schedule, performance and risk managements. It measures how much the value of actual work performed during period of time

BCWP = Percent work complete x Initial Budget Cost (BAC)

Where: Percent Complete = BCWP ÷ BAC

- Cost Variance (CV) and CV%

It computes the difference between actual cost and what it is expected to spend.

CV = Budgeted costs for work performed (BCWP) – Actual costs for work performed (ACWP)

Positive CV gives better indication of doing better on costs than it is planned.

- Schedule Variance (SV) and SV%

It computes the difference between where the project is and where the project is planned to be in the schedule.

SV = Budgeted costs for work performed (BCWP) – Budgeted costs for work scheduled (BCWS)

Positive amount indicates that project is a head of schedule and negative variance reflects to beyond schedule

- Cost Performance Index (CPI)

It is the rate at which project performance is meeting cost expectations during a period of time or from beginning up to a point in time.

$$CPI = \frac{BCWP}{ACWP}$$

If the CPI is equal or greater than 1, it is favorable value that indicates cost performance is perfect or physical progress is accomplishing at less than forecasted costs. and vice versa

- Schedule Performance Index (SPI)

It is rate which project performance is meeting schedule expectations up to point in a time. The performance Indices measure the efficiency as percentage.

$$SPI = \frac{BCWP}{BCWS}$$

If the SPI is equal or greater than 1, it is favorable value that indicates schedule performance is perfect or physical progress is accomplishing at faster than planned schedule. and vice versa and vice versa

- Estimate At Completion (EAC)

Is the amount which the project is expected to cost at its completion.

$$EAC = \frac{ACWP}{BCWP} \times BAC$$

or

$$EAC = \frac{BAC}{CPI}$$

EAC is frequent evaluation of project status. The revised EAC does not mean that corrective action is taken. Company should know the factors that cause the increase in EAC to know where is the overrun activities that occur high cost? It is preferred to identify the EAC by group of activities to consider the actual or revised of work packages not yet begun into the calculation of EAC.

Also, Time at completion (TAC) is useful to now the new length of the project, the longer the project is the longer time and higher costs it needs to be completed.

$$\begin{aligned} \text{New Length of Project} \\ = \frac{\text{Initial Project Length}}{SPI} \end{aligned}$$

- Estimate To Completion (ETC)

It is the expected cost that is required to spend from the current point of time to the end of the project.

$$ETC = EAC - ACWP$$

- Variance At Completion (VAC)

It measures the difference between the original budget and what we expect to spend at completion. If the result is positive amount it indicates that Project team is doing better than projected and negative indicates to project is run over on costs.

$$VAC = BAC - EAC$$

Project Manager or Cost controller should not only monitor the costs, they should manage the costs. Cost controller should prepare Project

Reports to the executives and internal auditor that contain the following information:

- Performance that show the progress to date such as PV, EV and AC, and material procurement and usage if there is no any Materials Report issued by Materials and Logistics.
- Status that identify where the project is today and shows CV and SV.
- Projection that calculate the EAC, ETC, SPI and CPI.
- Exceptions that justifying the variances and identify the problems, causes and situations.
 - o Indication of drilling problems such as the flow out and flow in, mud return rate, mud pit volume, cannot pickup pipe.
 - o Causes of drilling problems such as high formation permeability, low formation pore pressure, using wrong drilling fluid or mud weight. Carving, differential pressure.
 - o The results of drilling problems such as Cost of mud used, cost of fishing, loss of hole.
- The lessons that are learned from drilling programs. Such as Lack of experience and knowledge of personnel, and needs of crew education, and study wells in area, using centralizers, drill collars.

Learning and Growth prospective this prospective focus on employees. Nowadays and in future the employees represent significant assets. However, such assets are not accountingly recordable in ledgers. This prospective include the following KPIs

- Human capital value added (HCVA)

Human capital value added is calculated by adding the employment costs to operating

profit and dividing the results by number of full time employees. The bigger the ratio overtime, the better profitability per employee goes.

- Average employment and training costs by skills

The average employment and training costs by level of skilled employees provide management the cost rate of different level of skilled employees which can be used for cost allocation or to enable the company to know how much they spend for each level of worker in salary or training and whether the cost

- Employee satisfaction index (ESI)

To measure employee satisfaction, the company needs to have survey, ask few questions and ranking the optional answer, the survey questions needs to cover the style of leadership, communication, culture or work environment and staff development opportunities. Scoring the answers and give high rate for positive answer and low rate for negative answer, then compute the percentage of total scores to total questions. The higher index the better indication of higher satisfaction.

- Employees Turnover and average employee tenure

Recruiting and developing employees take long time and more cost. Employee retention save such time and costs. Also, replacing employees or promoting inappropriate people can cost company a lot.. Therefore, oil and gas companies intended to recruit and retain talented staff specially in technical and finance or accounting departments. The company can monitor the employees turnover by tracking the such ratio overtime and in different type

of job. The employees turnover is calculated by dividing the Total number of leavers in specific job over specific period by average total number of employees during the same period. The lower ratio the more employment settlement is, indication of less problems in management practices, philosophy and leadership style and less costs and time incurred in recruiting new employees

Average employee tenure ration enable Company to know how long its employee stay in the organization on average by total, gender, level of management, type of job or departments. The longer tenure the lower costs incurred for recruiting and training staff. Also, the longer tenure indicates to high employee satisfaction and loyalty to the Company. Average employee tenure ration (AET) is calculated as follow:

$$\frac{\sum(\text{Years of service} \times (\text{Number of employees}))}{\text{Total number of employees}}$$

- Salary Competitiveness Ratio

Company needs to know how much they pay to their employees in comparison to competitor's pay or market price to employees in similar position and job area to enable Company to know if it is potential employer and if payment is a reason to leave the company. This ratio can be calculated as follow and for specific job and position and by industry.

Salary competitiveness ratio = Salary offered by the Company ÷ Salary offered by the competitor or market

Company should consider the efficiency, effectiveness and proficiency of employee too before paying more than competitors or above industry average because paying salaries to inefficient and ineffective or low

proficient employees costs a company a lot for low quality of work.

Corporate Social Responsibility Prospective

Health, Safety, Environment and Security (HSES) issues have criminal and civil effects. The criminal law imposes on natural or in-kind personnel for protecting another natural or in-kind personnel. Criminal court may allocate the punishment among the personnel who commits the offences. Court can award compensation to victims or injured party. Civil Law concerns about the disputes between personnels. Plaintiff may bring complaint to court to get compensation and defendant try to reduce the compensation through involving the plaintiff in contributory negligence. Civil courts is looking for liability of two parties rather than for guilty and non-guilty that are concerned by criminal court. HSES cases always have civil disputes that caused by accidents, illness, breach of law or contractual terms and negligence.

The employers should reasonably and practicably ensure they achieve minimum legal and ethical requirements of HSES and welfare of all employees that can include the following:

- a. Safe System or Work
- b. Training and Supervision
- c. Safe place of work
- d. Written Safety policies and procedures
- e. Insure for work accident and fidelity
- f. Safeguard materials and people who are not in their employments but affected by employers' activities

Employees should take reasonable care of themselves and others who are affected by their activities, and should follow Company's HSES policy to enable Company to achieve their legal obligations and reducing potential risks.

Suppliers or contractors must follow Company's HSES policies or their own policies whichever is better for eliminating or reducing risks of HSES.

As we indicate to employer's responsibilities that HSES policy should be maintained and monitoring its application. The HSES policy should be clearly and simply stated to be understandable by different level of skills. The policy should include the following:

- a. Names and position of HSES people who are in charge and HSES advisors
- b. Duties toward each others (employers, employees, suppliers, customers, community)
- c. Short-term and long term objective

The HSES's objectives and performance targets could be mentioned in brief as follow:

- a. Reducing number of accidents
- b. Reducing number and period of absenteeism.
- c. Reducing criminal and civil claims
- d. Achieving international or national Safety requirements and obligations

Company shall frequently assess the risks of HSES by determining the volume and costs of severity and the likelihood of occurrence. Then to determine the proper and urgency of actions.

However, HSES is new and important issues, Companies should not exaggerate its care of HSES on other accounts of successful factors. Company should always look for cost and benefit of HSES controls.

Corporate Social Responsibilities include the following KPIs:

- Injury/Incident Index

Health and Safety issues could cause increasing costs that represents compensation to injured party, violation of

regulations, cost of losing opportunity for hiring skilled employees, attracting new long-term and ethical investors or contracting with high quality-experienced suppliers and paying high insurance premium.

Company should measure injury/incident to total working hours ratio which reflects the reduction of criminal/civil claims, reduction of number of accidents/injury and reduction in costs.

The Injury/accident Ratio is calculated as follow:

$$\text{Injury/Accident Index} = \frac{\text{Number of injury or accident}}{\text{Total working hours}} * \text{specific numbers}$$

- Pollution mission rate

Environment pollution is one of most serious challenges that our planet is encountered. Most of Oil and Gas Companies play important role to mitigate the environment pollution, the most effective index that measure the pollution rate is "Carbon/gas mission rate", "waste reduction rate". Many countries adopt legislation for environment protection. Also, some oil and gas companies might be granted ISO 14001 that cover the environment protection requirements. The lower pollution rate that caused by Company, the less long-term costs may be incurred and higher image the company can create for itself among community. For calculating the carbon or gas emission rate, the following factors should be considered:

- o Number of business travel
- o Energy consumed by company
- o Transportation of materials and commodity

- Waste generated.

- Gender Work Participation

Woman and Man are working to improve their community. After activating the international organization for woman rights and claiming for equality with man in obtaining equal opportunity for working and conducting managerial duties. Oil Companies' social responsibilities are to enhance gender work participation. Therefore, some oil companies announce in their sustainability report the gender work participation in different level of managements.

$$\text{Female employees Percent} = \frac{\text{Number of Females in Company}}{\text{Total Number of employees}}$$

The higher female employee percent encourage the high skilled woman to join working in such companies. Also, to reduce number of claims that are related to gender discrimination if companies take such target seriously.

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